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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,021	02/01/2005	Mitsunori Toyoda	122349	9499
25944	7590	08/14/2007	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			MATHEWS, ALAN A	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,021	Applicant(s) TOYODA, MITSUNORI	
	Examiner Alan A. Mathews	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-32, 46-51 and 54-57 is/are allowed.
- 6) ☒ Claim(s) 33-35, 37, 38, 40-42, 44, 52, 53, 58 and 59 is/are rejected.
- 7) ☒ Claim(s) 36, 39, 43 and 45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/6/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 6, 2007, has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 33, 37, 38, 40 – 42, 44, 52, 53, 58, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese patent document JP 2002-118043 (cited in Applicant's IDS filed June 6, 2007, along with an English translation) in view of Matsushita et al. (U. S. Patent Application Publication No. 2002/0126390 A1). The Japanese patent document JP 2002-118043 discloses in figure 1 and paragraphs # 0028 and # 0029 of the English translation an **optical integrator** 5 comprising a first optical member 51 having an integrally formed plurality of first

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minute refraction surfaces and a second optical member 52 having an integrally formed plurality of second minute refraction surfaces. Paragraph # 0073 discloses separating the first and second optical members 51 and 52 (micro fly eye) with either air (gas) or an inert gas. Paragraphs # 0053 and # 0054 disclose **differing refractive indexes for two kinds of microlens elements**. In addition, the last line of paragraph # 0066 states that **both micro fly eyes 51 and 52 may consist of two kinds of microlens elements**. With respect to claim 37, the alternative expression “spherically or aspherically” covers all possibilities. With respect to claims 40-42, figure 1 discloses mask 10 and a wafer (photosensitive substrate) 12. With respect to claim 59, it is noted that this is a product-by-process claim. MPEP 2113 states **that the determination of patentability of a product-by-process claim is based on the product itself. The patentability of a product does not depend on its method of production**. The product in the Japanese patent document JP 2002-118043 appears to be the same product as produced by claim 59. It is noted that MPEP 2113 gives an example where the process of making the product was allowed, but the product-by-process was rejected. Thus, the Japanese patent document JP 2002-118043 discloses the invention except for specifically stating or at least clearly stating that the refraction index of the second optical member 52 is set larger than a refraction index of the first optical member. Matsushita et al. discloses in figure 4 and paragraph # 0080, a first optical member at the element with the designation n_1 and a second optical member at the element with the designation n_3 . Paragraph # 0080 discloses, on the last line, an embodiment where $n_1 < n_2 < n_3$. Or written in another way, $n_3 > n_2 > n_1$. Thus, the refraction index of an optical material forming the second optical member (at n_3) is set larger than a refraction index of an optical material forming the first optical member (at n_1). It would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to have the refraction index of the second optical element 52 be larger than the refraction index in of the first optical member 51 in the Japanese patent document JP 2002-118043 in view of Matsushita et al. for the purpose of providing a better illumination distribution and thus producing a better exposure and thus producing a better final product.

4. Claims 33, 37, 38, 40 – 42, 44, 52, 53, 58, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese patent document JP 2002-118043 (cited in Applicant's IDS filed June 6, 2007, along with an English translation) in view of the Japanese patent document 2000-98102. The Japanese patent document JP 2002-118043 discloses in figure 1 and paragraphs # 0028 and # 0029 of the English translation an **optical integrator 5** comprising a first optical member 51 having an integrally formed plurality of first minute refraction surfaces and a second optical member 52 having an integrally formed plurality of second minute refraction surfaces. Paragraph # 0073 discloses separating the first and second optical members 51 and 52 (micro fly eye) with either air (gas) or an inert gas. Paragraphs # 0053 and # 0054 disclose **differing refractive indexes for two kinds of microlens elements**. In addition, the last line of paragraph # 0066 states that **both micro fly eyes 51 and 52 may consist of two kinds of microlens elements**. With respect to claim 37, the alternative expression “spherically or aspherically” covers all possibilities. With respect to claims 40-42, figure 1 discloses mask 10 and a wafer (substrate) 12. With respect to claim 59, it is noted that this is a product-by-process claim. MPEP 2113 states **that the determination of patentability of a product-by-process claim is based on the product itself. The patentability of a product does not depend on its**

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method of production. The product in the Japanese patent document JP 2002-118043 appears to be the same product as produced by claim 59. It is noted that MPEP 2113 gives an example where the process of making the product was allowed, but the product-by-process was rejected. Thus, the Japanese patent document JP 2002-118043 discloses the invention except for specifically stating or at least clearly stating that the refraction index of the second optical member 52 is set larger than a refraction index of the first optical member 51. The Japanese Patent document 2000-098102 discloses in figure 4 a first optical member 13 having a plurality of first minute refraction surfaces and a second optical member 14 having a plurality of second minute refraction surfaces. Paragraphs # 0028, # 0047 and # 0058 of the translation discloses that the refractive indexes of the optical element are $n_1 < n_2 < n_3$. Thus, either optical member 13 has a higher refractive index than optical member 14, or optical member 14 has a higher refractive index than optical member 13. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have the refraction index of the second optical element 52 be larger than the refraction index in of the first optical member 51 in the Japanese patent document JP 2002-118043 in view of the Japanese patent document 2000-98102 for the purpose of providing a better illumination distribution and thus producing a better exposure and thus producing a better final product.

5. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese patent document JP 2002-118043 in view of Matsushita et al. as applied to claim 33 above, and further in view of the Japanese patent document 07-098402. The modified device of the Japanese patent document JP 2002-118043 and Matsushita et al. disclose the invention

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except for specifically reciting the difference in the index of refraction $0.05 \leq n_b - n_a$. The Japanese patent document 07-098402 discloses in paragraph # 0100 of the English translation a refractive index difference of about 0.05. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the index of refraction differences $0.05 \leq n_b - n_a$ in modified device of the Japanese patent document JP 2002-118043 and Matsushita et al. in view of the Japanese patent document 07-098402 for the purpose of making a smaller difference and thus making better optical image.

Allowable Subject Matter

6. Claims 19-32, 46-51, and 54-57 are allowed. Claims 36, 39, 43, and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma - 1)^3 \cdot NA^2 / \Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a / ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces, and ϕ_b , a refracting power of the second minute refraction surfaces, is γ , numerical aperture on the emission side of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second

minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn ., in combination with all the other elements recited in independent claims 19.

The prior art does not disclose or suggest an optical integrator used for light having a wavelength of 300nm or less, wherein the optical material forming the first optical member includes fluorite, and wherein the optical material forming the second optical member includes silica glass in combination with all the other elements recited in the parent claim to dependent claim 36.

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma-1)^3 \cdot NA^2/\Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a/ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces, and ϕ_b , a refracting power of the second minute refraction surfaces, is γ , numerical aperture on the emission side of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn ., wherein an absolute value of the parameter β in terms of a direction optically approximately perpendicular to the scanning direction is set lower than an absolute value of the parameter β in terms of the scanning direction in

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combination with all the other elements recited in the parent claims to dependent claims 39, 43, and 45.

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma-1)^3 \cdot NA^2/\Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a/ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces in terms of a non-scanning direction optically approximately perpendicular to the scanning direction and ϕ_b , a refracting power of the second minute refraction surfaces in terms of the non-scanning direction is γ , numerical aperture on the emission side in terms of the non-scanning direction of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn , in combination with all the other elements (claim 46) or steps (claims 47, 50, and 54) recited in each of independent claims 46, 47, 50, and 54.

Conclusion

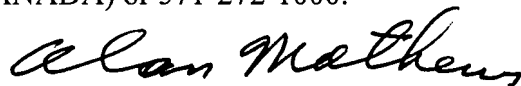
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patents cited in the PTO-1449 are cited for the same reasons they were cited in Applicant's IDS filed June 6, 2007.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Alan A. Mathews
Primary Examiner
Art Unit 2851

AM